

**Abstract**

An ion implantation system contains, in the ion implantation chamber, a workpiece holder that scans vertically while tilting a wafer at an angle of rotation that is rotated out of a perpendicular orientation with respect to the axis of projection in an ion beam. The implant  
5 angle into an implant surface on wafer that is retained by the workpiece holder is adjusted by selective rotation of the workpiece holder about its path of motion. A Faraday cup scans the ion beam along the intended location of the implant surface to form a setup measurement plane. The ion beam quality is adjusted to enhance beam uniformity along the setup plane according to these tilt-angle measurements. A charge neutralizing device, such as a flood  
10 gun, is moved in operational alignment with the workpiece.